

SECTION 4

TYPICAL SECTIONS

General

Subdivision streets shall be designed to the standards of the Division of Highways. The following outlines the requirements for subdivision street typical section design.

Subdivisions which are presently under construction with approved plans will be permitted to be developed utilizing the previously approved typical sections.

Street Classification (See Figure IV-1 and IV-2 - "Typical Sections for Residential Streets".

Minor Street - a street serving less than 50 dwelling units.

Minor Collector Street - a street serving between 50 and 300 dwelling units.

Major Collector Street - a street serving more than 300 dwelling units. Driveway access to major collector streets shall not be permitted without Department approval.

Soil and Foundation Investigation

For a pavement design utilizing good soil conditions, a soils investigation program shall be required for all proposed streets within the subdivision. Boring locations, sampling procedures and method of testing shall be approved by the Division of Highways. A soils investigation program will not be required if the developer intends to utilize the pavement section designed for poor soil conditions.

The Department reserves the right to make a check survey as part of the review of the developer's investigation work.

Results of the soil and foundation investigation shall include:

- 1.A plan and profile view of the subdivision streets showing boring locations and boring logs in accordance with the Standard Drawings of the Department.
- 2.Particle size analyses and Atterberg Limits for all soil sample taken.
- 3.AASHTO soil classification for each foot of boring taken.

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Pavement Design

The design of the pavement sections for subdivision streets shall be based on the type of soils as determined by the soils and foundation investigation, the anticipated number of units utilizing the streets and utilization of the streets by construction traffic.

The required structural numbers and examples of acceptable pavement sections are shown in the attached tabulations.

The streets serving over 50 units, a minimum of 3" of hot mix is required.

The streets serving over 300 units, a minimum of 4" of hot mix is required.

The first lift of hot mix shall be placed no later than 18 months from the Notice to Proceed or the beginning of the second winter after said Notice.

The final wearing course of hot mix on collector streets shall not be placed until 75% of the houses are completed or within one year of placement of the Type B base course of hot mix, whichever occurs first.

Prior to placing the pavement sections, the subgrade shall be prepared and test rolled as detailed in the Department Standard Specifications. If the test rolling shows the subgrade to be unstable, the contractor shall scarify, disc, aerate or add moisture and recompact the subgrade to the extent that when retested it will be stable. If, in the opinion of the Engineer, there are areas to be removed or undercut, they may be ordered excavated and replaced with approved material.

Curbs

Two types of curbing are permitted on subdivision streets; details are shown in Figure IV-3 "Alternative Subdivision Curbing". The Type 3 curbing shall be utilized on streets having grades of 8% or greater.

Curbing in residential subdivisions may be omitted when all of the following minimum conditions exist:

1. Average lot size of 1/2 acre.
2. Average lot frontage (excluding cul-de-sacs) of 100 feet.

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3. Average grades of streets are less than 6%.

4. Building set back of 60 feet.

An exception will be made to the above curbing policy when the existing soils are suitable for vertical drainage or the slope of the natural topography in the general area of the subdivision is less than 0.5%.

Industrial Park Streets

Streets serving industrial, commercial or manufacturing sites shall be constructed to the following standards.

I. Closed Drainage System (Curbed Section)

- Sixty foot (60') minimum right-of-way.
- Thirty six (36") minimum street width measured from face of curb. This will provide two 12 foot lanes with a one foot offset to the curb and a 10 foot left turn lane.
- Integral Curb and Gutter, Type 3 shall be used on all streets (see figure 4-3).
- Where possible utilities to be placed behind curb.

II. Open Drainage System (non curbed Section)

- Sixty foot (60') minimum right of way with fifteen (15') wide storm drainage easements on both sides of the right of way.
- Thirty four (34') minimum street width. This will provide two 12 foot lanes and a 10 foot left turn lane.
- Six foot (6') wide grass shoulders. Minimum design shall be 4" topsoil and seed on 9" crusher run.
- Depth of parallel ditches shall be 2'-6' minimum.
- Where possible utilities to be placed outside of paved street.

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Parking Bays Adjacent to Reduced Right-of-Way

Parking bays are to be constructed utilizing 2" of Hot Mix Type C on 6" of Graded Aggregate. Construction details are to be included in the construction plans for the streets and are to be constructed in accordance with the requirements of the Division of Highways.

Pavement Sections

Pavement Sections are to be designed based on the soil conditions and the number of single family units utilizing the planned street. The pavement sections listed below are provided as examples which provide the required Structural Numbers, but other sections which meet the Structural Number requirement are acceptable. Four rules apply however:

- 1)At least 2" of hot-mix must be provided, 3" on collector streets;
- 2)At least 6" of graded aggregate must be provided on good soils, 8" on poor soils;
- 3)Hot-mix may only be applied over graded aggregate, never directly over select borrow;
- 4)Undisturbed sub-grade cannot be counted in Structural Number calculations.

The pavement section of a street built to serve a future area of development shall be increased in strength to serve both the present and future traffic loads. If such a street must also serve the construction traffic of future development, the pavement section shall again be increased in strength as follows:

<u>No. of Units Proposed for Future Development Area</u>	<u>Increase in Structural</u>
<u>Number</u>	
1-100	0.48
over 100	0.80

NOTE:Good Soils - all soils within the A-1, A-2 and A-3 AASHTO soil classifications.

Poor Soils - all soils within the A-4, A-5, A-6 and A-7 AASHTO soil classifications.

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<u>Pavement</u>	<u>Required Structural</u>			<u>Example</u>
	<u>Number</u>			
<u>No. of Units</u>	Good Soil	Poor Soil	Good Soil	Poor Soil
1-15	1.40	2.40	2" - C <u>6" - Graded Agg.</u> SN = 1.64	1 1/4" - C 1 3/4" - B <u>9" - Graded Agg.</u> SN = 2.46
16-50	1.70	2.70	2" - C <u>7" - Graded Agg.</u> SN = 1.78	1 1/4" - C 1 3/4" - B <u>11" - Graded Agg.</u> SN = 2.74
51-100	2.00	2.90	1 1/4" - C 1 3/4" - B <u>6" - Graded Agg.</u> SN = 2.04	1 1/4" - C 2 1/4" - B <u>11" - Graded Agg.</u> SN = 2.94
101-200	2.50	3.30	1 1/4" - C 1 3/4" - B <u>10" - Graded Agg.</u> SN = 2.60	1 3/4" - C 3" - B <u>10" - Graded Agg.</u> SN = 3.30
201-300	2.90	3.70	1 1/4" - C 2 1/4" - B <u>11" - Graded Agg.</u> SN = 2.94	1 3/4" - C 4" - B <u>10" - Graded Agg.</u> SN = 3.70
Over 300	3.30	4.10	1 3/4" - C 3" - B <u>10" - Graded Agg.</u> SN = 3.30	1 3/4" - C 4" - B <u>13" - Graded Agg.</u> SN = 4.12

TABULATION OF STRUCTURAL NUMBERS

<u>Use</u>	<u>Material</u>	<u>Structural Number for Inch Thickness</u>
Surface Course	Type C Hot Mix	0.40
Binder Course	Type A Hot Mix	0.35
	Type B Hot Mix	0.40
Base Course	Select Borrow	0.08
	Quarry Waste	0.11
	Graded Aggregate	0.14
	Soil Cement (6% Cement + 1%)	0.20
	Bituminous Concrete	0.32
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AASHTO SOIL CLASSIFICATION*

Group	Sub-Group	Soil Description	Subgrade Rating
A-1		Well-graded gravel or sand; may include fines	
	A-1-a	Largely gravel but can include sand and fines	
	A-1-b	Gravelly sand or graded sand; may include fines	
A-2		Sands and gravels with excessive fines	Excellent to Good
	A-2-4	Sands, gravels with low plasticity silt fines	
	A-2-5	Sands, gravels with elastic silt fines	
	A-2-6	Sands, gravels with clay fines	
	A-2-7	Sands, gravels with highly plastic clay fines	
A-3		Fine Sands	
A-4		Low-compressibility silts	
A-5		High-compressibility silts, micaceous silts	
A-6		Lot-to-medium compressibility clays	Fair to Poor
A-7		High-compressibility clays	
	A-7-5	High-compressibility, silty clays	
	A-7-6	High-compressibility, high volume change clays	
A-8		Peat, Highly organic soils	Unsatisfactory

*Specific grain-size and Atterberg limit criteria exist for each group and sub-group and can be found in most general references on soil mechanics or pavement design.

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